

SETTLE AND CLAPHAM.—By the same train which conducts the party to Malham, another party will leave for Settle under the guidance of Mr. J. J. Brigg. After visiting the Victoria Caves, they will drive to Ingleton and lunch. From there they will walk through the beautiful grounds of Mr. J. A. Farrer and explore the Clapham Caves, in which most extraordinary specimens of stalactites and stalagmites are to be seen.

The two last excursions are specially intended for geologists.

YORK.—It is, of course, essential that York, where the first meeting of the British Association was held seventy years ago, should be visited. The party will arrive in York about 11 o'clock, under the leadership of Mr. J. A. Clapham. The visitors will immediately proceed to see the walls, the museum, and St. Mary's Abbey. Then, after lunch at the Station Hotel, they will visit the Minister, where most of the afternoon will be spent. By the invitation of the Lord Mayor, they will afterwards be entertained to tea at the Guildhall before leaving for the station.

For all the half-day excursions a uniform charge will be made, and similarly for Thursday's excursions there will also be a uniform charge. Visitors applying for excursions will be required to hand in this fee, together with the application form; and tickets, as nearly as possible in accordance with their preferences, will be allotted to them. By making all the excursions of equal cost, it is expected that the work of allotment will be simplified.

The next article will deal with the mayoral and civic functions that have been arranged, and some account will be given of the large garden-party which the municipality will hold on Monday, September 10, and of the various private garden-parties to be given on September 12.

RAMSDEN BACCHUS.

NOTES.

WE regret to announce the death of Dr. John Anderson, F.R.S., the distinguished zoologist.

DR. D. MORRIS, C.M.G., the Imperial Commissioner of Agriculture for the West Indies, has just arrived in this country.

PROF. G. CAREY FOSTER, F.R.S., has been appointed Principal of University College. Prof. Foster is a Fellow of the College, and was formerly professor of Experimental Physics and Quain Professor of Physics; he is also a Fellow of the University of London, in which University he acted as examiner previous to his election to the Senate.

THE International Geological Congress is now in session at Paris. Among the items included in the programme are discussions on international co-operation in geology, fundamental researches for the establishment of a definitive classification, scheme for an international lexicon of petrology, and the photography of types of fossil species.

REUTER reports that Major Gibbons, the African traveller, reached Omdurman on August 20. The line of route traversed by the expedition represents a distance of 13,000 miles. Among the objects attained were the mapping of Barotseland; the accomplishment of the first steam navigation of the Middle Zambezi; and the tracing of the whole course of the river, the discovery of its source, and the determination of its watershed. Thence the route of the expedition was eastward, and by way of the Great Lakes and the Nile.

THE annual meeting of the English Arboricultural Society was held at Manchester last week. Prof. Somerville was appointed president for the ensuing year. Reports were read from

the judges upon essays on "Foreign *versus* Native Timber," "Agricultural and Woodland Drainage," and "Thinning." The silver medal for the first essay was awarded to Mr. George Cadell, late of the Indian Forest Department, and bronze medals for the other essays were given to Mr. D. A. Glen, of Kirby, near Liverpool, and Mr. A. Dean, of Egham.

THE third annual report of the Council of the Röntgen Society shows that the society is making satisfactory progress. The demonstrations at the meetings are very valuable to all workers with Röntgen rays, and the papers and abstracts published in the *Archives* enable members who are unable to attend the meetings to keep well in touch with the latest developments of radiographic work. Dr. J. B. Macintyre, one of the earliest and most prominent investigators with Röntgen rays, has consented to be nominated as the next president of the society.

SIR WILLIAM STOKES, the eminent surgeon, died suddenly at Pietermaritzburg on Saturday. He filled the post of President of the Royal College of Surgeons of Ireland in 1896; and among his other appointments was the professorship of surgery in the Royal College of Surgeons in 1872, senior surgeon of the Government Hospital of Ireland in 1868, president of the Pathological Society of Ireland, and Surgeon in Ordinary to the Queen in Ireland from 1892. He was the author of a number of addresses, and contributions to the medical press, on clinical and operative surgery.

A REUTER telegram from St. Petersburg states that news has been received there from Dr. Sven Hedin, showing that his expedition this spring to Lob Nor to settle the various questions in dispute regarding that lake and its surroundings has resulted in discoveries exceeding his expectations. He found, in fact, that the lake known to previous explorers no longer exists, having dried up, leaving its bottom strewn with shells and marine growths. Around this old basin, however, a regular system of new lakes has been formed, which Dr. Sven Hedin has explored and mapped. In connection with this announcement, it is worth remark that at the time of the visit of Prince Henry of Orleans to Lob Nor, towards the end of 1889, the lake consisted of a number of interlacing lakes and river-arms, the contraction of the former large water-area being probably due to the using up of the waters of the Tarim for irrigation by the increasing population of the river basin.

THE *Scientific American* announces that the U.S. Congress has granted funds for the inauguration of agricultural experiment stations in the islands of Hawaii and Porto Rico. Prof. S. A. Knapp has been selected to investigate the agricultural conditions and possibilities of Porto Rico. He went to the island in June, and will study the lines of experimental investigation which should be undertaken there, places suitable for stations, and the approximate expense of inaugurating and maintaining the work. Dr. W. C. Stubbs will make a preliminary survey of the conditions in the Hawaiian Islands. He sailed for Hawaii about the middle of July, and will spend the month of August in the islands. The conditions there are somewhat different from those of Porto Rico, as a station for experiments in sugar production has been maintained by private beneficence for a number of years.

THE Berlin Academy of Science has (says *Science*) made the following grants for scientific work: Prof. Adolf Schmidt, of Gotha, for the collating and publication of material on terrestrial magnetism, 750 marks; Dr. Leonhard Schultze, of Jena, for investigations on the heart of invertebrates, 2000 marks; Prof. Emil Ballowitz, of Greifswald, for investigations on the structure of the organs of smell of vertebrates, 800 marks; Dr. Theodore Boveri, of Würzburg, for experiments in cytology, 500 marks;

Prof. Maxime Braun, of Königsberg, for studies on the Trematodea, 970 marks ; Dr. Paul Kuckuck, of Heligoland, for investigations on the development of Phæosporeæ, 400 marks ; Dr. Wilhelm Solomon, of Heidelberg, for his geological and mineralogical investigations in the Adamello mountains, 1000 marks ; Prof. Alexander Tornquist, of Strassburg, for the publication of his work on the mountains of Vicenza, 1100 marks ; Prof. Alfred Voltzkow, of Strassburg, for the drawings of his work on the development of the crocodile, 1000 marks : Prof. Johannes Walther, of Jena, for the publication of his work on deserts, 1000 marks.

WE learn from the *Daily Graphic* that the Norwegian Government has built and fitted out a steam vessel for the express purpose of marine scientific research, and has placed her, as well as a trained staff of assistants, in charge of Dr. J. Hjort as leader of the Norwegian Fishery and Marine Investigations. The vessel herself, the *Michael Sars*, has been constructed in Norway on the lines of an English steam trawler—that type of boat being regarded as the most seaworthy and suitable for such an expedition—but considerably larger, being 132 feet in length, 23 feet beam, and fitted with triple expansion engines of 300 horse-power. The fishing gear includes, *inter alia*, trawls, nets, and lines of all kinds, with massive steel hawsers and powerful steam winches to work the heavy apparatus, while the numerous scientific instruments are of the very best and latest description. The expedition left Christiania in the middle of July, on what may be termed its trial trip along the Norwegian coast (accompanied for part of the time by Dr. Nansen, who was desirous of testing various instruments in which he had made improvements), and has just sailed from Tromsö on a lengthy cruise to the North Atlantic and Arctic Oceans. Dr. Hjort has already added so much to the knowledge of pelagic fishes, their life, habits, and the causes affecting their migrations, that, with the means now at his disposal, a considerable amount of valuable information will probably be gained which will prove of service to the fishing industry of all nations.

MESSRS. JOCHELSON AND BOGORAS, of the Jesup North Pacific Expedition of the American Museum, recently started for the north-eastern part of Asia, by way of San Francisco and Vladivostok, to continue the work of the expedition in Siberia. A few particulars of the investigations undertaken are given in the *American Museum Journal*. The region to be visited is situated north-east of the Amur River. The explorers will study the relations of the native tribes of that area to the inhabitants of the extreme north-western part of America, and also to the Asiatic races visited by Dr. Laufer, under the auspices of the Museum, and to those living farther west. It is expected that in this manner they will succeed in clearing up much of the racial history of these peoples, and it is hoped that the question as to the relations between the aborigines of America and Asia will be definitely settled. Thus the work proposed is part of the general plan of the Jesup North Pacific Expedition, which was organised for the investigation of the relations between the tribes of Asia and America. It is fortunate that this inquiry has been taken up at the present time, since the gold discoveries along the coast of Bering Sea are rapidly changing the conditions of native life ; so that within a few years their primitive customs, and perhaps the tribes themselves, will be extinct. It is expected that the journey, which will extend over a period of two years, will result in a series of most interesting additions to the collections of the Museum, and in an important advancement of our knowledge of the peoples of the world.

IT has already been noted (vol. 61, p. 451) that Prof. A. Heilprin has brought forward evidence which throws doubt

upon the permanence of the waters of Lake Nicaragua, the fountain head of the San Juan River. His conclusions have been criticised, but he gives further reasons for them in the *Bulletin* of the Geographical Society of Philadelphia (July), and shows that this new factor will have to be taken into consideration in connection with the proposed Nicaragua Canal. The full conclusions now drawn by Prof. Heilprin from data furnished by the Nicaragua Canal Commission of 1897-99, and the special reports of the chief engineer and hydrographer appended thereto, are :—(1) Lake Nicaragua has undergone marked shrinkage during the period of the last twenty-five to fifty years. (2) The shrinkage is a progressive one, and there are no known conditions by which the loss incurred can be made good. (3) The assumption is well founded that the earlier measurements of the altitude of the lake surface, made by Galisteo and Baily, indicating an abasement of the waters by 20 to 30 feet, were accurate. The relations of these conditions to canal construction become immediately apparent, and it may well be agreed that a region subject to the changes which have been indicated "would offer serious obstacles to the construction of a canal of the magnitude of the one proposed or to its permanency after construction."

MR. W. N. SHAW, F.R.S., informs us that Mr. W. Kennedy, the observer for the Meteorological Office at Roche's Point, co. Cork, notes that at 9.15 p.m. (G.M.T.) on August 13 a very large meteor shot into view eastward, going E.S.E. At about an altitude of 70° it exploded with a brilliant flash, and a noise was heard like that of a rocket fired off at some distance. The meteor left a long luminous track visible for some seconds after the explosion. The trail would have been very brilliant but that the eastern sky was lit up by the moon at the same time.

IN the afternoon of Friday, August 17, some parts of the south of London were visited by one of the sharpest thunderstorms that have occurred for some time. The weather was very close, the thermometer reaching 82°, and the distribution of barometric pressure was of a complex character. During the storm, which lasted about an hour, and was accompanied by a heavy hail squall, the amount of rainfall at the central part, near Herne Hill, was 1.2 inch. In some parts of the suburbs the roads were completely flooded, while in others comparatively little rain fell. At Westminster there was none, at Brixton 0.4 inch, and at Greenwich only five-hundredths of an inch. During the same afternoon a severe thunderstorm also occurred at Ilford, Essex.

A DISCUSSION of the thunderstorm observations recorded in 1897 at ten selected stations in India, by Mr. W. L. Dallas, is contained in Part ix. vol. vi. of the *Indian Meteorological Memoirs*. The results for the year have been divided into five-day periods. The storm-frequency varies considerably in different parts, but, generally speaking, the number of storms is unimportant during February and the early part of March ; but after the middle of March the thunderstorm season commences, and continues until the middle of October, the maxima occurring towards the end of May and September. After October 23 no storms are reported. Storms are much more frequent in the afternoon than in the morning, and when a storm occurs in the forenoon it is followed, almost without exception, by another in the afternoon. There is a belief that the damage done by lightning in the tropics is slight compared with that done in temperate zones, and the fact that at ten observatories in the year in question only four instances of damage being recorded gives support to this belief.

PROF. CANCANI remarks in a recent paper (*Ital. Soc. Sismol. Boll.*, vi. pp. 37-42) that seismology stands almost alone among the sciences of observation and experiment in that so far no

pattern instrument and no comparable apparatus have been introduced. He admits that the Seismological Committee of the British Association have taken a step in the right direction, but considers that the instrument used by them possesses several defects which prevent its general adoption. The conditions which should be satisfied by the type apparatus, he describes as follows: It must be astatic or possess a stationary mass, and must be equally capable of recording the very small and rapid preliminary vibrations and the subsequent undulations of long period; it must have the sanction of experience, the cost of erection and maintenance must be small, and the construction so simple that it does not easily get out of order; it must allow the continuous inspection of the traces, and its sensibility must lie within convenient limits.

ABOUT two years ago Dr. Samson brought forward evidence that sunstroke was an infectious disease, and consequently due to microbic influences. This view has not met with general acceptance, and Mr. E. H. Freeland, who has had exceptional opportunity of observing cases of sunstroke, both ashore and afloat, shows in the *Middlesex Hospital Journal* (July) that all the phenomena of this affection can be explained on general physiological principles without reference to germs at all. He concludes his paper as follows:—"Whether sunstroke be due to external physical causes, or whether it be an infectious disease and due primarily to a micro-organism which has yet to be isolated, must be decided in the future. For the present it seems to me that there is ample evidence for believing that sunstroke is due primarily to thermic influences—the exposure of the body to a hot moisture-laden atmosphere—and secondarily to the circulation in the blood of certain toxic poisons, the result of perverted tissue metabolism; and that, until more tangible evidence is brought forward to prove that the affection is due to microbic influence, one may safely accept the older doctrine with regard to its causation as a sound working hypothesis, if nothing else."

PROF. F. E. NIPHER, of Washington University, St. Louis, Missouri, has sent some further particulars with reference to the methods he uses to obtain a "zero" plate. His observations upon photographic reversal have already been noticed in these columns (pp. 62, 159), and he has pointed out the bearing of his work upon eclipse photography (p. 246). The following details of the operations he follows may enable other photographers to repeat his experiments. "The plate is placed under a punched stencil in a printing frame. It is exposed at 1 cm. from a 16 c.p. lamp. By a few trials one can find the time-interval of exposure, so conditioned that nothing will develop on the plate in a developer of fixed composition, strength and temperature, and at a fixed distance from the 16 c.p. lamp. This is a standard developer. With a shorter time of exposure than that giving the zero plate, a negative will result, and with a longer time, a positive. A plate to be used in taking any picture to be developed in the standard developer (as a positive) is all exposed to the 16 c.p. light at a distance 1 cm. for a time which experiment has shown will put the film into the zero condition when developed in the standard bath. It is then put into the plate-holder, and given a camera exposure in the usual way, after which it is developed. It is not important that the developing bath should be at any particular distance from the lamp. The plate is to be pre-exposed so that a zero plate will result in that particular bath, at any fixed distance from the lamp. I usually make this distance about eight inches."

ACCORDING to Maxwell's electromagnetic theories, a moving body charged electrically produces a magnetic field. In the *Bulletin* of the French Physical Society, M. V. Crémieu

gives a brief note on certain experiments destined to test the actual existence of such a field, as well as the converse result that a moving charge placed in a variable magnetic field experiences a certain ponderomotive force. Having, at the suggestion of M. Lippmann, conducted some experiments for the purpose of investigating the latter effect, with negative results, M. Crémieu now gives an account of certain investigations made with a disc of 37 cm. in diameter, rotating at the rate of 100 to 130 revolutions per second in the centre of an annular coil connected with a highly sensitive galvanometer. If the disc is suddenly charged, the convection current thus produced should give rise to an induced current through the galvanometer, and the magnitude of the convection current being determined by the number of revolutions and the density of the charge, the amount of the expected deflection of the galvanometer could be calculated. No deviation of the predicted magnitude was obtained, and the author concluded that a moving charge does not produce a magnetic field. Such a conclusion leads logically to the rejection of existing theories of the electric current, and M. Crémieu proposes to conduct further experiments with the object of throwing more light on this difficult question. The author does not, in this note, say anything about the effects of the self-induction of the rotating disc, and further information on this point appears desirable in criticising the results.

A FEW interesting details referring to the use of wireless telegraphy in the French navy are given by a naval correspondent of the *Daily Graphic*. It is stated that half-a-dozen ships in the combined French squadron recently at Cherbourg were fitted for wireless telegraphy, and the clicking, crackling, and sparking of the big coils was heard on board all day. Messages have been taken in and sent out at distances quite twice or three times as great as anything achieved with the instruments in use in the British ships. The French do not fit the wire to a gaff as in our ships; it is suspended between the funnels to the triatic stay, and is much less conspicuous. The manoeuvring of the submarine boats, *Morse* and *Nautilus*, is described as marvellous; they are, it is stated, much ahead of the American *Holland* boat, which is considered to be a formidable weapon.

AN interesting and detailed account of Count von Zeppelin's successful trial trip of his navigable balloon on July 2 is given in *Die Umschau* by an anonymous author, who has endeavoured to dispel the somewhat exaggerated reports which have been circulated as to the success or failure of the experiment. It is pointed out that the delay in the ascent, which some persons attributed to an accident, was really caused by the wind being too strong at the time originally proposed for the trip. The wind-velocity at the time of starting was 5.5 metres per second, and the balloon was actually driven forwards for a short distance in the face of this wind. But after a short time the path deviated till it made an angle of 30° with the wind-direction. This deviation, the writer explains, was due to several causes. In the first place the rope broke which supported the movable mass necessary for the maintenance of longitudinal balance, and to restore equilibrium it was necessary to stop or even reverse one of the machines, so that the balloon could no longer be driven full ahead. Moreover, the framework was found to have undergone a little deformation, which gave the machine a slight bias to one side, interfering with the steering. The wind causing the balloon to drift towards the shore, a descent was made in order that Count Zeppelin might land on the water (to use an Irishism), and thus have his machine towed back by steamer. The descent was very gradual, the cars gently sinking down to the water without the sudden jerk which is commonly experienced in an ordinary balloon. This result is attributed to the favour-

able form of the balloon, a cylinder experiencing greater resistance than a sphere. The performance of the motors and screws is described as brilliant.

WE have already referred to the great loss anthropology has sustained in the death of Mr. Frank Hamilton Cushing on April 10. In the current number of the *American Anthropologist* are memorial notices by various leading American anthropologists, from which it is evident that a peculiarly gifted and winning personality has passed away. Mr. Cushing had great manual dexterity and an acute appreciation of how things were made, and he had practised himself to do anything an American Indian could accomplish, and with the same limited resources. For five years he lived with the Zuñi Indians, living their life and familiarising himself with their ideas and modes of thought, and he rose high in the social Pueblo life, taking part in their councils and in their sacred ceremonies. An intense eagerness to learn more and more of aboriginal thought and deed was the mainspring of his life, and his kindly sympathetic nature and keen intelligence and dexterity placed him in the front rank of field investigators. We understand that Mr. Cushing left an immense amount of MS. material, which it is to be hoped will be fully published, for his published works by no means do justice to the extent and value of his researches.

OUR contemporary *Science*, for July 27, contains a summary of the "Lacey Act," recently passed by Congress for the protection of game and other birds in the United States, and for the regulation of the importation of foreign birds and mammals. The carrying out of this important Act has been confided by the Secretary of the Department of Agriculture to the Division of Biology, Dr. T. S. Palmer being the officer selected to supervise its actual administration. Dr. Palmer has lost no time in making known the principles of the new law, having already published a *Bulletin* of the Department, entitled "Protection and Importation of Birds, under Act of Congress, approved May 25, 1900." As regards the importation of wild animals and birds, an absolute veto is placed on certain injurious species; and importers must in all cases obtain special permits from the Secretary of Agriculture before a single individual can be landed. These permits should be applied for in advance. No permits are issued for shipping birds from one State to another, although in certain States the Commissioners of Fish and Game have authority to allow the shipment of a limited number for breeding purposes. No permits are necessary for domesticated birds, and the same applies to natural history specimens for museums. In the case of the larger ruminants special permits will be issued, as heretofore, in the form prescribed for domesticated mammals. The prohibited species include the European house-sparrow, the starling, fruit-bats or flying foxes, and the mongoose, or ichneumon. Special inspectors are appointed to carry out the law, and to give advice in cases of difficulty. The attention of all concerned is drawn to those sections which make it unlawful to ship from one State to another animals or birds taken in contravention of local laws, and which require all packages containing live birds and animals to be clearly marked with the name and address of the shipper, and with the nature of their contents.

WHETHER or no the inferior animals have souls, forms the subject of an article by Herr S. von Uexküll in the *Biol. Centralblatt* of August 1.

IN Part 3 of vol. xxviii. of the *Morphologisches Jahrbuch*, Dr. B. Haller publishes his third memoir on the vertebrate brain, treating specially of that of the mouse, but adding some observations in regard to Echidna. The second article in the same

number is by Dr. Fürbringer, and treats of the systematic position of the Myxinoids. The author is of opinion that vertebrates should be subdivided as follows:—

- I. Acrania (Amphioxina).
- II. Craniota :
 - (1) Distoma (Myxinoides).
 - (2) Cyclostoma (Petromyzontes).
 - (3) Gnathostoma :
 - (a) Anamia (Pisces, Dipneusta, Amphibia).
 - (b) Amniota (Reptilia et Aves, Mammalia).

WE have received the *Report* of the Manchester Museum for 1899-1900. From this we learn that the Museum has been enriched during the period in question with two collections of first-class importance, one of these being Mr. C. H. Schill's cabinet of Lepidoptera, and the other the Layard collection of weapons and implements.

IN the concluding part of his "Ornithological Notes," published in the July issue of the *Victorian Naturalist*, Mr. Robert Hall, of Melbourne, discusses the question whether a tree-building diamond-bird (Pardalotes) is the foster-parent of a cuckoo. In the case referred to the young cuckoo was actually seen to be fed by the diamond-bird, one of whose own young was brought up with it. The incident is at present quite unique.

THE Library of the Patent Office is an institution known and appreciated by many students of science, both pure and applied. A series of classified catalogues of the contents of the Library has just been started by the publication of a "Subject List of Works on Photography and the Allied Arts and Sciences." Each volume of the series will contain (1) a general alphabet of subject headings, with descriptive entries, in chronological order, of the works arranged under these headings; (2) a key or a summary of these headings shown in class order. The present list comprises 557 works (73 serials, 484 text-books, &c.) wholly or in part photographic—representing 1300 volumes. The catalogue is really a valuable little bibliography of photography as well as a guide to the contents of the Library.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*), a — Monkey (*Cercopithecus*, sp. inc.) from West Africa, presented by Mr. L. J. Sparrow; a Mozambique Monkey (*Cercopithecus pygerythrus*) from East Africa, presented by Mr. C. Mackay; three Pheasants (*Phasianus colchicus*), British; a Common Peafowl (*Pavo cristatus*, ♂) from India, presented by Captain G. H. Arnot; a Long-legged Buzzard (*Buteo ferox*), a Black Kite (*Milvus migrans*), two Lesser Kestrels (*Tinnunculus cenchris*), European, two American Kestrels (*Tinnunculus sparverius*) from America, presented by Mr. J. Simonds; a Bengal Weaver Bird (*Ploceus bengalensis*), a Manyar Weaver Bird (*Ploceus manyar*), four Black-throated Weaver Bird (*Ploceus atrigula*), an Indian Roller (*Coracias indica*) from India, presented by Mr. E. W. Harper; a Spiny-tailed Iguana (*Ctenosaura acanthura*) from Central America, presented by Mr. C. Hagenbeck; a Common Lizard (*Lacerta vivipara*), British, presented by Mr. Stanley S. Flower; a Military Macaw (*Ara militaris*) from South America, a Roseate Cockatoo (*Cacatua roseicapilla*), six Blue Lizards (*Cerrophorus coeruleus*) from Australia, three Blue-tongued Lizards (*Tiliqua scincoides*) from Western North America, a White-collared Kingfisher (*Halcyon chloris*) from India, a Saddle-backed Tortoise (*Testudo ephippium*), three Albemarle Tortoises (*Testudo vicina*), two Thin-shelled Tortoises (*Testudo microphyes*) from the Galapagos Islands, deposited; an Argali Sheep (*Ovis ammon*, ♀) from the Altai Mountains, two Black Storks (*Ciconia nigra*), European; a Ring-necked Pheasant (*Phasianus torquatus*) from China, purchased; four Indian Crows (*Corvus splendens*), a

Little Cormorant (*Phalacrocorax javanicus*), a Green-winged Dove (*Chalcopteryx indica*) from India, received in exchange; a Japanese Deer (*Cervus sika*), five Rosy-billed Ducks (*Metopiana peposaca*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

VELOCITIES OF METEORS.—At the second annual meeting of the Astronomical and Astrophysical Society of America, recently held at Columbia University, New York, Dr. W. L. Elkin described the apparatus and results of photographs obtained at the Yale Observatory for the determination of the velocity of meteors (*Science*, vol. xii. pp. 125-6). The idea of using photography for this purpose appears to have been first suggested by J. H. Lane in 1860, but it was not until 1885 that Zenker made the next practical attempt in Berlin, and attention has again been recently called to the matter by Prof. Fitzgerald. The Yale apparatus consists of a bicycle wheel fitted with twelve radial opaque screens, fixed so that, while rotating, the screens are brought intermittently in front of the cameras. The wheel as at present worked makes about 50-60 revolutions per minute, but it would be better to increase this speed in future apparatus. A check on the velocity is afforded by records made each revolution on a chronograph. The length of interruption of the meteor trail and the consequent velocity are then determinable if a second observation of the meteor from a distant station has been obtained. In November and December 1899, five such duplicate trails were secured. The apparent velocities of these are given as 50°4, 12°2, 50°3, 20°2, 36°5 kilometres per sec.; their altitudes varying from 45 to 100 kilometres. Correcting the apparent velocities for the attraction of the earth and the diurnal rotation by Schiaparelli's formulæ, the true velocities with respect to the sun are 34°4, 32°0, 32°4, 39°8, 34°0 kilometres per sec.

Comparing these velocities with those calculated on assumption of parabolic or elliptic orbits, the real velocities are in all cases smaller, indicating that the atmospheric retardation has amounted to 8-15 kilometres per sec. The elements deduced for one meteor, an Andromedid, agree remarkably closely with those of Biela's comet, showing the method to be capable of considerable accuracy.

STANDARDS FOR FAINT STELLAR MAGNITUDES.—Prof. E. C. Pickering announced at the above-mentioned conference that a grant of 500 dollars had been made from the Romford Fund for the purpose of carrying out an investigation on the brightness of faint stars by the co-operation of several observatories possessing large telescopes. The point immediately desirable is the accurate measurement of a few stars which shall serve as standards for future work on a larger scale. Five photometers have been constructed, each having a photographic wedge which may be interposed between the eye and the star as seen by the telescope. Thirty-six regions have been carefully selected in different parts of the sky, and twenty stars (five of each of magnitudes 12, 15, 16, 17) are to be chosen in each region, the faintest to be selected and measured with the Lick and Yerkes telescopes. The stars of the 16th magnitude will be measured with the 26-inch of the University of Virginia, and perhaps also with the 23-inch Princeton refractor; those of the 15th magnitude will be measured by the 15-inch Harvard telescope. All of these are to be then compared with stars of the 12th magnitude, whose *absolute* magnitudes will finally be determined with the 12-inch Harvard meridian photometer. After the work is properly got in hand, it is hoped that it may be reduced to a simple routine without sacrificing the quality of the results.

THE TOTAL SOLAR ECLIPSE, MAY 28, 1900.—As more detailed reports of the results obtained by the American observers during the recent total eclipse come to hand, it is interesting to note the increased use which has been made of large diffraction gratings, both concave and plane. In *Science* (vol. xii. pp. 174-184), Mr. L. E. Jewell describes the work at Pinehurst, N.C., and Griffin, Georgia, of the two parties organised by the physical department of the Johns Hopkins University. At each station there were installed two spectroscopes, one having a plane diffraction grating, surface 3 x 5 inches, 15,000 lines to the inch, used in conjunction with a quartz lens to photograph the spectrum of the first order; the other having a concave grating of 10 feet radius and 15,000 lines to the inch, mounted

in the usual Rowland form, with a large quartz lens to throw an image of the sun on the slit-plate from a heliostat. The photographs were very successful, and show the spectrum from wave-lengths 3000 to 6000, even the exposures of only one second giving good negatives.

In the same number of *Science* Profs. E. B. Frost and E. E. Barnard describe the apparatus they successfully used, during the same eclipse at Wadesboro, N.C.

REPORT OF THE CAPE OBSERVATORY.—In his report for the year 1899 Sir David Gill, Her Majesty's Astronomer at the Cape of Good Hope Observatory, makes special mention of the completion of the new record room, providing storage for manuscripts, the safe preservation and orderly arrangement of the precious astrographic plates, and also serving as the place where the measurements of these plates are undertaken.

The pier and foundations for the new transit circle are completed, but the delay in obtaining the sheet steel dome has kept the work at a standstill. The observations with the transit instrument have been mainly those of the standard stars for the reduction of the Catalogue Astrographic plates. When the new transit circle arrives it will be entirely devoted to the systematic meridian observations of the sun, Mercury, Venus and fundamental stars. With the heliometer, observations of all the oppositions of major planets have been continued.

The 24-inch object glass of the McClean equatorial was returned to Sir Howard Grubb for refixing, and this instrument has hitherto only been used with a slit spectroscope for stellar spectra. Since the photographic objective was dismounted the 18-inch visual lens has been used for measurements of twenty-one close double stars. The 7-inch equatorial has been used in the revision of the Cape Photographic Durchmusterung, in the observation of suspected variable stars, and in the detection of double stars.

The 6-inch instrument with a Zollner photometer has been used for determining the visual magnitudes of stars in selected areas of different galactic latitudes, the photographic magnitudes of which are already determined. A comparison between the visual and photographic magnitudes will subsequently be made. With the astrographic equatorial 152 chart plates and 184 revision catalogue plates have been passed. 103 plates, containing 38,785 stars, have been measured during the year, all observations showing an error of 0°6 being repeated.

Seventy-eight photographs of *Iris* were taken during the period July 11-December 31, with six exposures on each plate. In conjunction with meridian observations of comparison stars, it is intended to use the results of the measurements of these plates for determining the mass of the moon.

The geodetic survey of South Africa and Rhodesia has been considerably advanced, but was interrupted by the outbreak of the Transvaal war. The Anglo-German boundary survey has been hindered by the waterless character of the Kalahari Desert, but the work is now completed as far as Arahob, from which an offset chain will be carried to the 20th meridian.

ROUSDON OBSERVATORY (DEVON).—Sir C. E. Peek sends a pamphlet of sixteen pages containing the sixth contribution of systematic observations of variable stars made at his observatory at Roudon, Lyme Regis, Devonshire. The present report furnishes the details of the variability of *T Cassiopeiae* for the ten years 1889-1898, and of *R Cassiopeiae* for the twelve years 1887-1898. The light curves of both stars are also plotted at the end of the pamphlet.

INDEPENDENT DAY NUMBERS FOR 1902.—A small pamphlet has been issued from the Cape Observatory giving the independent day numbers for correcting the places of stars given in the *Nautical Almanac* for 1902. The values of the constants of precession, aberration and nutation employed in these tables are those recommended by the Paris International Conference of 1896.

THE AUGUST PERSEIDS OF 1900.

OBSERVATIONS of this well-known annual display were much hindered by moonlight, though the weather was generally clear at about the time of the maximum. Our satellite was full on the evening of August 10, and obscured all the smaller meteors. Apart, however, from this interference, the shower of 1900 seems to have been a somewhat scanty one. It furnished a considerable number of large